

## **Diabetes And Complications For People Who Have Diabetes (Part 3 of 3)**

**Satellite Conference  
Tuesday, November 8, 2005  
2:00-4:00 p.m. (Central Time)**

**Produced by the Alabama Department of Public Health  
Video Communications Division**

## **Faculty**

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## **What is Diabetes? Diabetes = high blood sugar**



## **Diabetes**

- **Body lacks insulin or is unable to use insulin effectively**

## **Could I Have Diabetes?**

- **Low energy**
- **Extreme thirst**
- **Blurred vision**
- **Frequent urination**



## **Could I Have Diabetes?**

- **Weight changes**
- **Irritability**
- **Tingling/numbness**
- **Frequent infections**



## Diabetes

- A disease that affects nearly 10% of adults in Alabama



## A Disease That Can Lead to Many Complications



## What Complications Occur In Persons With Diabetes Mellitus?

- Kidney disease
  - (Nephropathy)
- Eye disease
  - (retinopathy, cataracts and glaucoma)
- Nerve damage
  - (peripheral neuropathy, erectile dysfunction, intestinal problems)

## Other Things To Watch For:

- Depression
- Foot injuries
- Wounds that are slow to heal
- Vaginal yeast infections
- Gingivitis (gum disease)
- Sleep apnea
- High blood pressure
- Stroke
- Heart attack
- Dehydration

## Why Do These Complications Occur?

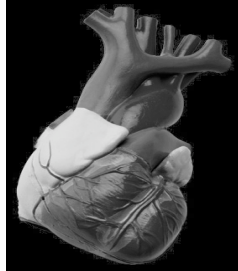
- Complications probably result from long-term exposure to high levels of glucose.
- Glucose attaches to proteins throughout the body, causing them damage.
- Nerves and blood vessels contain proteins that are “coated” with glucose.
- Nerves become less responsive.
- Blood vessels become more easily clogged and ruptured.

## What Is The Best Way To Slow Progression Of Complications?

- Keep the blood glucose level in the normal range
- Eat sensibly
- Exercise sensibly
- Take medications as prescribed
- No smoking
- Modest alcohol consumption

## Complications Of Diabetes

- Heart and blood vessel disease



The blood vessels in your body are like the plumbing system in your house. Clean water enters the system through one set of pipes, and used water leaves the system through a separate set of pipes.

In our bodies, the fresh blood travels through arteries, while the used blood returns to the heart through veins.

As our “pipes” get older, they build up sludge. This sludge can block the flow of blood to our brain (that is the cause of a stroke) or to our heart (that is the cause of a heart attack).

## Complications Of Diabetes

- Heart and blood vessel disease
- Kidney disease
- Eye damage
- Foot damage
- Infections, slow to heal
- Gum disease



## The Risks - Macrovascular

- Heart disease – the #1 killer of persons with Type 2 diabetes
- Peripheral vascular disease
- Cerebral vascular disease
  - Individuals with diabetes are 2 to 4 times more likely to die of a heart attack or stroke

## The Risks - Microvascular

- Retinopathy, potentially leading to blindness
  - 12,000 – 24,000 individuals with diabetes lose their sight each year
- Nephropathy, potentially leading to end-stage renal disease
  - 10% - 21% of persons with diabetes develop kidney disease

## The Risks - Microvascular

- Neuropathy, potential cause of lower-limb amputations and erectile dysfunction
  - 60% - 70% of individuals with diabetes have nerve damage
  - 56,200 persons with diabetes have lower limb amputations each year

### The Risks - Other

- Acute life-threatening events
  - Severe hyperglycemia, diabetic ketoacidosis
  - Severe hypoglycemia, insulin excess
- Dental disease
  - 2 times higher risk in those with diabetes
  - One third of individuals with diabetes have severe periodontal disease

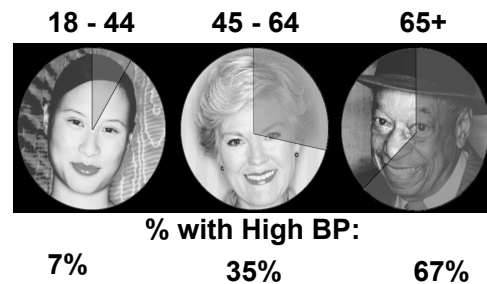
### The Risks - Other

- Sleep apnea
- Depression
- More susceptible to many other illnesses and those with diabetes have a worse prognosis

### High Blood Pressure – A Silent And Serious Disease



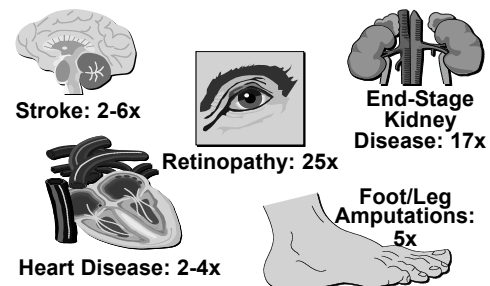
### Age Increases Your Chance Of High Blood Pressure



### Go For The Goal!

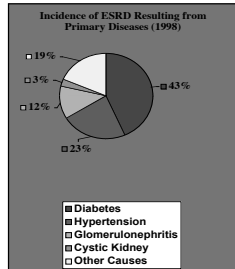


### Long-Term Complications Of Diabetes



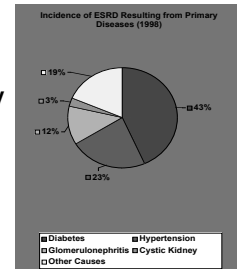
## Diabetic Nephropathy

- Over 40% of new cases of end-stage renal disease (ESRD) are attributed to diabetes.
- In 2001, 41,312 people with diabetes began treatment for end-stage renal disease.



## Diabetic Nephropathy

- In 2001, it cost \$22.8 billion in public and private funds to treat patients with kidney failure.
- Minorities experience higher than average rates of kidney disease.



## Prevention of Diabetic Nephropathy

- Hypertension Control - Goal: lower blood pressure to <130/80 mmHg
- Treat high blood pressure with drugs
- Eat less salty foods
- Do not smoke
- Lose weight
- Have your urine checked for protein (albumin)
  - “Microalbumin Test”

## Diabetic Retinopathy

- Diabetic retinopathy is the most common cause of new cases of blindness among adults 20-74 years of age.
- Each year, between 12,000 to 24,000 people lose their sight because of diabetes.
- During the first two decades of disease, nearly all patients with type 1 diabetes and over 60% of patients with type 2 diabetes have retinopathy.



## DM-Related Blindness

- More than 20,000 people go blind each year.
- 90% of cases of blindness could be prevented with proper screening and care.
- Persons with diabetes are also at risk for cataracts (cloudy lens) and glaucoma (high pressure inside the eye).
- Only 60% of people with DM get an annual dilated-eye exam.

## Diabetic Neuropathy

- About 60-70% of people with diabetes have mild to severe forms of nervous system damage, including:
  - Impaired sensation or pain in the feet or hands
  - Slowed digestion of food in the stomach
  - Erectile dysfunction
  - Other nerve problems



## Diabetic Neuropathy

- More than 60% of nontraumatic lower-limb amputations in the United States occur among people with diabetes.



## Risk Factors

- Poor glucose control
- Duration of diabetes
- Damage to blood vessels
- Mechanical injury to nerves
- Genetic susceptibility
- Lifestyle factors
  - Smoking
  - Obesity

## Essentials Of Foot Care

- Foot examination for all patients at every visit to health care provider
- Patients with neuropathy - visual inspection of feet every day
  - Use a mirror if necessary

## Essentials Of Foot Care

- Use moisturizing lotion to prevent dryness and cracking on the bottom of the feet, but keep the area between the toes dry to prevent fungal growth.
  - File calluses with a pumice stone, never cut them.
  - Cut toenails weekly or as needed, use a podiatrist if necessary.
  - Always wear cotton or wool socks and well-fitting shoes with an insert.
  - Notify their health care provider immediately if any foot problems occur.

## Depression

- Common, disabling, unrecognized, and treatable



## Different Symptoms for Different People

- Loss of energy
- Eating problems
- Sleeping problems
- Being slowed down or agitated
- Difficulty concentrating
- Feelings of worthlessness, helplessness, or guilt
- Thoughts of suicide

### **Risk Factors For Depression**

- Family history of disease
- Being female
- Certain medications
- Substance abuse
- Previous episode of depression
- Serious or long-term illness
- Life events

**What can you do to decrease the chances that you will develop complications?**

### **Risk Factors You Cannot Change**

- Increasing age
- Family history of disease
- Race or ethnicity
- Gestational diabetes or having a baby weighing 9+ lbs at birth

### **Risk Factors You Can Change**

- Inactive lifestyle
- Overweight

### **Use Less Salt**



### **Monitor Your Blood Glucose Frequently**

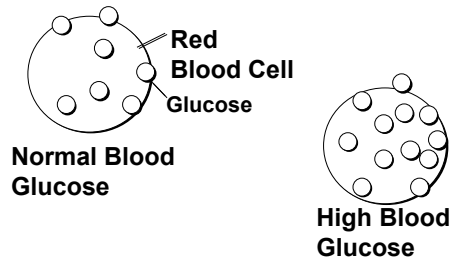
- Gain immediate information about how you are doing.
- Monitor the effect of changes in lifestyle and medication adjustments.
- Relate symptoms of high and low blood glucose with blood glucose test results.

## 7-Day Trends in Blood Glucose Levels

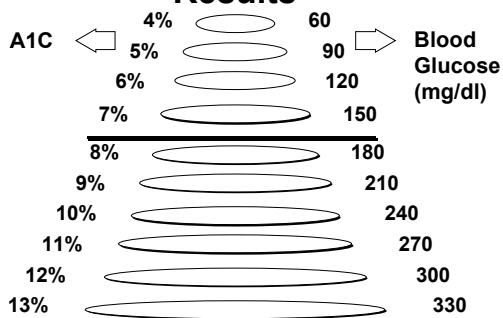
### Recommended Testing Pattern

	Breakfast		Lunch		Supper		Bedtime
	Pre	Post	Pre	Post	Pre	Post	
Mon	✓	✓					✓
Tue	✓		✓	✓			
Wed	✓				✓	✓	
Thu	✓	✓					✓
Fri	✓		✓	✓			
Sat	✓				✓	✓	
Sun	✓	✓					✓

## A1C Measures Glucose Levels over 2-3 Month Period



## A1C and Self-Monitoring Results



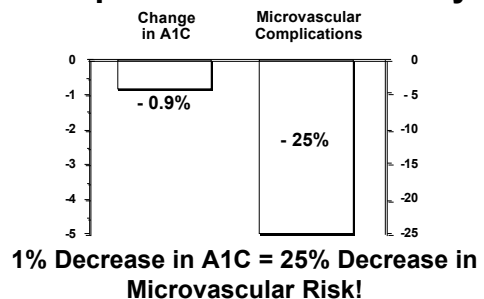
## Diabetes Treatment Cost Control Flow Chart

Levels of HgbA1C (%) Being Compared	Greater Per-Person Treatment Cost Associated with a 1 Percentage Higher HbA1C Value
10% with 9%	\$1,200 - \$4,100
9% with 8%	\$ 900 - \$3,100
8% with 7%	\$ 600 - \$2,200
7% with 6%	\$ 400 - \$1,500

## Results From Diabetes Studies

- Good diabetes management results in
- **REDUCED** microvascular disease
  - eye disease
  - kidney disease
  - neuropathy
- **REDUCED** macrovascular disease
  - heart disease
  - stroke

## United Kingdom Prospective Diabetes Study

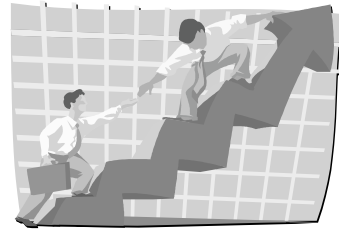


## Factors That Increase Risk For Complications

- Poor blood sugar control
- Uncontrolled blood pressure
- High cholesterol
- Smoking



## Steps You Can Take To Improve Your Diabetes Self Management



## Watch Your Weight



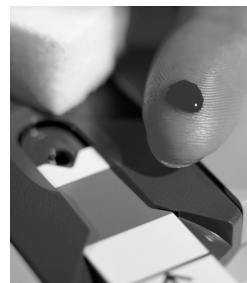
## Exercise Regularly



## Stop Smoking



## Control Your Blood Sugar



## Reduce Cholesterol



## Eat Healthy Foods

- Avoid fatty foods
- Eat 5-9 servings of fruits and vegetables every day
- Avoid drinks containing sugar
- Do not “supersize” your portions

## Be Alert To Kidney Disease

- Have your urine checked for protein on a regular basis
  - “Microalbumin Test”

## Exercise and Weight Loss

- Increases insulin sensitivity
- Increases HDL cholesterol (the good cholesterol)
- Decreases blood pressure and cholesterol
- Increases energy level

## What is Regular Physical Activity? It's not about vigorous exercise!

- Walking, bicycling, swimming or jogging
- Start with 10 minutes per day, 3-5 days a week
- Work up to 30 minutes, 7 days a week



## Medications

Classes of Medications	Examples
Insulin	Lantus, Humalog, Novolog, Regular, NPH, Lente, Ultralente, NPH/R: 70/30, 75/25, 50/50
Secretagogues	Glucotrol, Glucotrol XL, Glyburide, Amaryl, Starlix, Prandin
Metformin	Glucophage
Thiazolidinediones	Avandia, Actose
Alpha-glucosidase Inhibitors	Precose, Acarbose
Combination Pills	Glucovance, Metaglip, Avandamet

### **What Is The Best Way To Slow Progression Of Complications?**

- Keep the blood glucose level in the normal range
- Eat sensibly
- Exercise sensibly
- Take medications as prescribed
- No smoking
- Modest alcohol consumption

### **Keep Your Eyes In Check**



### **Keep Your Feet Healthy**



### **Stop Smoking**

### **Don't Forget Your Gums**



### **Action Steps**

- Follow your exercise plan
- Take your medications as prescribed
- Know Your Numbers!
  - Get all required tests
  - Monitor your blood glucose frequently

## Summary

- Good diabetes control matters!
- Good control involves proper use of lifestyle tools and medications.
- Regular and frequent monitoring of all aspects of diabetes is essential to good control.
- Meet with your healthcare professional regularly to evaluate your treatment program.

## What's New?

### Gastric By-pass and Restriction Surgery

- Gastric surgery to limit food absorption, also called “Bariatric Surgery” is gaining wider acceptance as an intervention for individuals who are very overweight.
- The surgical procedures have significant costs and risks associated with them.
- Spectacular success stories, and disastrous outcomes, are both being reported.
- This program will attempt to present an objective analysis of the relative costs, risks, and benefits that are associated with bariatric surgery.

**BMI = Body Mass Index = Weight (kg)/Height (meters) x Height (meters)**

BMI Range	Meaning
less than 18.5	Underweight
18.5 - 24.9	Normal
25.0 - 29.9	Overweight
30.0 - 34.9	Obese
35.0 - 39.9	Severely Obese
40.0 - 50	Morbidly Obese
over 50	Super Obese

Individuals who have a BMI = 40 and over generally qualify for weight-loss surgery.  
With certain life-threatening co-morbid conditions, those with a BMI 35-40 may also qualify.

## The Worsening Epidemic Of Obesity And Diabetes In The USA

- 1999-2000 NHANES Data (JAMA, Oct 2002)
  - 65% overweight (BMI  $\geq 25$ )
  - 31% obese (BMI  $\geq 30$ )
  - 5% morbidly obese (BMI  $\geq 40$ )

NHANES=National Health and Nutrition Examination Survey.

## Case Study



- Age : 17y 4m
- Weight: 167.8 kg, Height: 160.7 cm
- BMI: 65 kg/m<sup>2</sup>
- PCOS/hyperinsulinemia
- Morbid obesity
- Obstructive sleep apnea
- Orthopedic complaints
- Mild depression
- Failed aggressive medical management over 4 years of follow-up

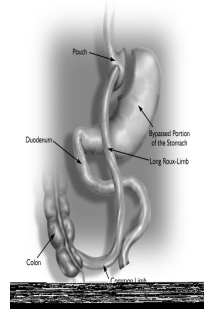
**Behavioral and Pharmacological treatments are unlikely to result in a cure for her symptoms.**

**Gastric by-pass surgery is much more likely to improve or completely cure her symptoms.**

**Is she a good candidate for gastric by-pass surgery?**

## **Bariatric Surgery?**

- Patient selection must be stringent.
- Numerous psychosocial issues to monitor before and after the procedure.
- Should only be performed in experienced Centers.
- Several techniques available.
- 1 in 200 mortality rate.



The number of bariatric surgeries in the US jumped to 103,200 in 2003, up from 16,200 in the early 1990s, according to the American Society of Bariatric Surgery.

The procedure should be considered only for those with a body-mass index above 40--or about 100 pounds overweight--or for slightly less obese people with BMI 35-40 and life-threatening complications such as high blood pressure or coronary disease, according to the National Institutes of Health.

## **The Issues:**

- Cost
- Return on investment
- Safety
- Effectiveness
- Life-long follow-up
- Non-compliance of patients
- Quality-of-life improvements
- Costs of non-treatment: direct and indirect

## **Outcomes:**

- Meta-Analysis of 136 studies published by the JAMA, October 2004
- Large weight losses reported
- Improvements or cures in other areas:
  - Type 2 diabetes often cured
  - Obstructive sleep apnea cured
  - Hypertension controlled

For someone who is interested in the concept of surgery to manage clinically severe obesity, one important question is:

**What are the risks and benefits surrounding such an operation?**

**There are always risks associated with surgery.  
There is no more effective way to achieve weight loss.**

## **Tying It All Together!**

- Diabetes affects the whole body.
- Keeping blood sugar under control prevents complications.
- Speak with your healthcare provider.



## **Get All Required Tests**

- Every visit
  - Blood pressure
  - Foot exam
- Every 3-6 months
  - A1C
    - Every 3 months if initial value shows poor control
    - Every 6 months if initial value shows good control
- Every year
  - Eye examination
  - Lipid levels
  - Microalbumin

## **Upcoming Programs**

**Components of a Family Planning Chart  
Review: Would Your Chart  
Stand Up To Scrutiny?**  
Thursday, November 10, 2005  
2:00-4:00 p.m. (Central Time)

**Facing Fear: Crisis Communication and  
Disaster Behavioral Health**  
Tuesday, November 15, 2005  
12:00-1:30 p.m. (Central Time)

## **Upcoming Programs**

**Loss of Bladder Control Across the  
Adult Population**  
Thursday, November 17, 2005  
2:00-3:00 p.m. (Central Time)

**First Aid for the Home Care Worker**  
Tuesday, November 29, 2005  
2:00-4:00 p.m. (Central Time)

To register for these conferences and to  
view all upcoming programs,  
[www.adph.org/alphtn](http://www.adph.org/alphtn)